

Future Roles Of The U.S. Nuclear Submarine

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Preface

This paper evaluates the importance of U.S. nuclear powered submarines in national security in the 21st century. In the post-Cold War environment, many in government and the military have either spoken out against or ignored the need for submarine integration into a more Joint and Combined military force structure. Both *Fast Attack* and *Fleet Ballistic Missile* submarines are a necessary part of any great nation's balanced military and certainly any Naval Fleet.

This paper will focus on two issues: nuclear submarines as a relevant conventional and nuclear deterrent force and the need for submarines to be more fully integrated within the military and other national agencies.

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Abstract

U.S. nuclear submarines will remain a potent conventional and nuclear force in the 21st century. The submarine's unique characteristics of stealth, endurance, survivability, mobility, flexibility, and lethality make it an invaluable asset not only in the pursuit of deterrence, but also in the achievement of National Military Strategy objectives. Though submarines are an instrumental tool in these matters, they need to be more integrated within the Department of Defense in order to maximize their impact. The United States should make the best of the personnel and equipment on hand while looking to the future for an opportunity to incorporate new capabilities in submarine warfare.

Seven major areas of change should be vigorously pursued in order to meet the 21st century challenges. First, four *Ohio* class submarines should be converted to guided-missile submarines. Second, *Fleet Ballistic Missile* submarines should perform more of the traditional *Fast Attack* submarine roles. Third, more realistic training should be conducted by submarine crews, using their own ships' equipment whenever possible. Also, submarine officers should pursue more Joint Professional Education. Fourth, *Fast Attack* submarine production should be increased to at least two, but preferably three, per year. Fifth, a submarine fire support capability should be developed. Sixth, naval and submarine doctrine should be changed to more fully support Joint Vision 2010 and *Operational Maneuver From the Sea*. Finally, a Theater Missile Defense role for *Fleet Ballistic Missile* submarines should be developed.

Introduction

This essay will argue that the nuclear submarine is both a viable conventional force and a necessary nuclear deterrent force due to its characteristics of stealth, endurance, survivability, mobility, flexibility, and lethality. The submarine's unique characteristics make it an invaluable asset not only in the pursuit of deterrence, but also in the achievement of National Military Strategy objectives.

Both *Fast Attack* and *Fleet Ballistic Missile* submarines are a necessary part of any great nation's balanced military and certainly any Naval Fleet. This paper focuses on submarine capabilities in two aspects. First, all nuclear submarines are a relevant conventional and nuclear deterrent force. Second, submarines need to be more integrated within the military and other national agencies. This paper will use future requirements and concepts as stated in the National Military Strategy, Joint Vision 2010, and ...*Forward From the Sea* as a guide to evaluate and determine the submarine capabilities required in the 21st century.

Submarine integration into Naval Battle Group operations was not possible until after World War Two (WWII) with the advent of the nuclear powered submarine in 1954. Prior to this time, submarines were limited to submerged operations of short duration at slow speeds due to the reliance on electric battery power for propulsion. They could not keep up with the fast battleship and carrier-dominated Surface Fleet. By the time submarines were able to keep pace with the Fleet, the Cold War was starting to boil and demanded an independent patrol mode for submarines rather than more integration.

Today, the capabilities of submarines allow them to move with or ahead of the Fleet's stride, bring tremendous firepower to the fight, and perform a variety of Joint

missions. Submarines bring additional and unique capabilities to the Joint Task Force (JTF). Even with this tremendous capability, today's submarines are not optimized for the Joint Vision 2010 concept.

All elements of national power (military, diplomatic, economic, and information) should be used to deter aggression and resolve international problems before they boil over into crisis. *Fast Attack* and *Fleet Ballistic Missile* submarines are invaluable to the military realm of power in their deterrence roles due to the following inherent characteristics: survivable strategic ballistic nuclear missiles, stealthy land strike missiles, covert Special Operating Forces (SOF) insertion and extraction, enduring intelligence gathering platforms, and lethal anti-ship and antisubmarine platforms.

Future submarines will need to be designed to meet Joint Vision 2010 concepts and to have the flexibility to change as the mission changes. Current initiatives in the *Virginia* class *Fast Attack* SSN will make it the first submarine designed to meet Joint Vision 2010 concepts and provide the necessary flexibility through Commercial-Off-The-Shelf procurement and modularity. Further advances in submarine design will be needed in the 21st century, some evolutionary and others revolutionary.

Using the following methodology, the rest of this paper will demonstrate the strategic significance of nuclear submarines. Chapter two will cover the traditional role of the submarine and show its inherent capabilities. Chapter three will analyze the applicable portions of the current National Security Strategy, National Military Strategy, Joint Vision 2010, and Naval Strategies and show how the submarine helps to accomplish the objectives stated in each of these documents. Chapter four will analyze the future role of submarines with respect to capabilities, using the two lenses of deterrence and

integration. Finally, chapter five will conclude with recommendations and options for the future.

Chapter 2: Traditional Role of Submarine

Those who must plan for future regional conflicts should recognize the historical role of the submarine as a force multiplier.¹

--VADM Roger F. Bacon

The traditional role of submarines will be examined in three phases. First, this chapter will examine the birth and early development of submarines. Second, it will analyze the use of submarines as a weapon of war, using the experiences of World War I (WWI) and WWII. Finally, it will examine the evolution of submarines into true submersibles with the addition of nuclear weapons.

Evolution of the Submarine

Man's fascination with the undersea world and desire to obtain a wartime advantage from submersibles date back centuries prior to the *Holland*. An Egyptian wall painting from the Nile Valley depicts duck hunters creeping upon their prey from just under the water's surface by breathing through hollow papyrus reeds. During the siege of Syracuse, Athenians used divers to clear the harbor entrance. Alexander the Great descended in a device that kept him dry and admitted light. In 1578, William Bourne designed a submersible that could be navigated underwater by contracting the sides to submerge and then rowing. The first practical submarine, designed by Cornelius Van Drebbel in 1620, was a rowboat covered with greased leather that used floating snorkel tubes to permit several hours of submergence at 12 to 15 feet in the Thames River.²

The first recorded event of a submarine's being used as a weapon came in the American Revolution. *USS Turtle*, built to break the British blockade of New York

¹ VADM Roger F. Bacon, "Submarine Warfare It's A-Changing," U.S. Naval Institute Proceedings, June 1992, 52.

Harbor, was not able to plant its mine (a keg of powder) since the boring device could not penetrate the copper coated hull of *HMS Eagle*.³ The first successful submarine attack was attributed to the *CSS H.L. Hunley* in Charleston Harbor in 1864 against the *USS Housatonic*.⁴ *Hunley* used a 90-pound charge projected from the ship by a long pole as a torpedo and sank not only the enemy ship, but also herself.⁵

The United States Navy Submarine Force can trace its origin to April 11, 1900 when, after demonstration trials off Mt. Vernon on the Potomac River, the Navy purchased its first submarine, *Holland*. CDR Harry H. Caldwell⁶ assumed command of *Holland*, and she was commissioned six days later on October 12, 1900.⁷ *Holland* was not designed to patrol in the seas. Her mission was to defend harbors and patrol the coast.⁸

In 1898, Assistant Secretary of the Navy Theodore Roosevelt suggested the purchase of *Holland* for its potential use at Havana Harbor in the Spanish-American War.⁹ She carried three Whitehead torpedoes and a bow gun. The torpedoes used a pressure-sensitive piston for depth control, a pendulum for stabilization, and a gyroscope for direction control. *Holland's* stealth was compromised since, lacking a periscope, she had to surface to see the enemy prior to attacking.¹⁰ Simon Lake built the *Seal* and improved modern submarine design, correcting this sight deficiency as well as others. He is

² "The Saga of the Submarine," reprinted from *ALL HANDS*, September 1967, <<http://www.chinfo.navy.mil/navpalib/ships/submarines/centennial/subsaga.html>> (16 November 1999).

³ "The Saga of the Submarine."

⁴ "Submarine Technological History,"

<<http://www.chinfo.navy.mil/navpalib/ships/submarines/centennial/subhistory.html>> (16 November 1999).

⁵ "The Saga of the Submarine."

⁶ "Submarine Pioneers," <www.chinfo.navy.mil/navpalib/ships/submarines/centennial/pioneers.html> (16 November 1999).

⁷ "Submarine Pioneers."

⁸ "The Saga of the Submarine."

⁹ "Submarine Technological History."

¹⁰ "The Saga of the Submarine."

credited with developing the following enhancements: escape trunk, conning tower, diving planes, control room, and periscope (rotating and retractable).¹¹

Early submarines lacked a reliable mode of propulsion. Men turning a crankshaft did not suffice. The internal combustion engine provided the submarine speed and relative endurance on the surface, but the rechargeable electric storage battery allowed submerged propulsion without the deadly internal combustion engine gases. Later, the diesel engine provided improvements over the gasoline engine as it resulted in fewer toxic fumes and better fuel economy. The primary propulsion mode was diesel power on the surface and electric drive submerged (diesel-electric) until 1954 when nuclear power propelled the *Nautilus*.¹²

The Submarine as a Weapon

WWI is the first war in which submarines played a significant role. Submarines in WWI executed three distinct roles: attrition of surface combatants, interdiction of commercial shipping, and coastal defense. Submarines of WWI vintage were actually surface ships that submerged for only brief periods to execute their mission of attacking lone ships or convoys and to avoid air attack. Once they were submerged, their underwater endurance was one hour at five to six knots. The U.S. submarine's weapons load was only four torpedoes. These torpedoes, driven by compressed air, were greatly improved in range, reliability, and lethality during the interwar period.¹³

The British and American governments did not emphasize submarines since they considered their use as a weapon to be unethical. They did not believe a submarine was capable of sinking capital ships, such as a battleship; however, in September 1914, a

¹¹ "Submarine Technological History."

¹² "The Saga of the Submarine."

single "Unterseeboote" (U-boat) sank three of Britain's best light cruisers with five torpedoes off the coast of Holland. This encounter proved that submarines were a viable weapon system that could sink warships and resulted in the curtailment of fleet operations at sea.¹⁴

Although Germany had 29 U-boats, no more than ten were at sea on any given day of WWI, yet they presented such a large threat that Britain built more than 3,000 vessels to defeat them.¹⁵ "In World War I the U-boats came perilously close to defeating the Allies."¹⁶ The Allied response of convoys, supported by air and surface escorts with the added benefit of radar and intelligence that revealed U-boat positions eventually caused heavy submarine losses. The loss of essential, experienced personnel demoralized German submariners:

a minimum of improved submarines manned by inferior crews, facing vastly improved Allied antisubmarine measures, which produced a rapid decline in U-boats sunk and an increasing loss of submarines – with consequent and decisive loss of the morale of that service.¹⁷

During WWI, increased submerged endurance and deeper diving depths were achieved by the introduction of chemical air purification, compressed oxygen, and strengthened internal bulkheads with all-welded hulls. By the end of WWI, submarine design focused on improving range, endurance, and stealth capabilities in order to improve combat effectiveness.¹⁸

¹³ Norman Polmar, Videocassette interview, Weapons at War, 50 min., A&E Television Networks, 1996.

¹⁴ Polmar, Weapons at War.

¹⁵ Robert P. Haffa, Jr. and James H. Patton, Jr., "Analogues of Stealth: Submarines and Aircraft," Comparative Strategy 10 (1991): 260.

¹⁶ Cope and Karig, 237.

¹⁷ RADM Harley Cope and CAPT Walter Karig, Battle Submerged: Submarine Fighters of World War II (New York: W. W. Norton and Company, 1951), 239.

¹⁸ "Submarine Technological History."

During the interwar period, the U.S. Submarine Force asked itself how submarines could be used effectively. New construction was focused on improving range and armament for independent patrols, since the submarine technology of the day would not allow them to keep pace with the Battle Fleet as planned. Training and exercises prepared the Submarine Force for the tactics it would need if called upon to implement unrestricted warfare against enemy and neutral commercial ships.¹⁹ Still, once unrestricted submarine warfare was implemented following the Japanese attack on Pearl Harbor, many months passed before the Submarine Force became comfortable with the new mission of unrestricted submarine warfare.²⁰

the [U.S.] Navy entered [WWII] with a preponderance of large fleet-type submarines....displac[ing] in the neighborhood of 1[,]500 tons.... The average fleet-type submarine was manned by a crew of 7 officers and 70 men. It had a cruising range of 10,000 miles and carried supplies for 60 days. Surface speed was 20 knots; submerged speed 9 knots. Underwater endurance at 2 ½ knots was 48 hours. Power on the surface was derived from a diesel-electric engine and motor combination; storage batteries furnished juice to the electric motors when submerged. During 1942 the installation of both air-search and surface-search radars greatly increased the effectiveness of American submarines. Their initial armament consisted of six to ten 21-inch torpedo tubes, one 3-inch 50-caliber deck gun and two .50-caliber machine guns.... About 18 spare torpedoes were carried.... The warheads...were supposed to detonate whether the torpedo struck a target or passed close to the magnetic field of a metallic hull.²¹

More than 80% of all ship losses in WWII were due to submarines,²² but both sides paid an extremely high price for this success. Approximately 25% of U.S. submarines sent out on patrol in the Pacific did not return; by the end of WWII, nine out of every ten

¹⁹ Dr. Gary Weir, "Silent Defense: One Hundred Years of the American Submarine Force," U.S. Naval Historical Center, 27 April 1999, <<http://www.chinfo.navy.mil/navpalib/ships/submarines/centennial/fullhist.html>> (16 November 1999).

²⁰ Clay Blair, Jr., et al., The U.S. Submarine War Against Japan, vol. 1 of Silent Victory (New York: J. B. Lippincott, 1975), xvi.

²¹ Samuel Eliot Morison, History of United States Naval Operations in World War II: Coral Sea, Midway and Submarine Actions, May 1942-August 1942. (Boston: Little, Brown and Company, 1949), 494-5.

²² "The Saga of the Submarine."

U-boats sent on patrol never returned.²³ The Germans lost 781 submarines in WWII and had only 398 on hand at the end of the war.²⁴ In contrast to U.S. and German submarines, Japanese submarines played an insignificant role in the outcome of the war due to poor employment.²⁵

Without submarines in WWII, the balance of power in the Atlantic would have shifted toward the Allies much more quickly. Strategic plans would have been markedly different. The Battle of the Atlantic would not have occurred. Germany did not have the naval power to interdict Britain's Sea Lines of Communication without submarines.

Germans used the concept of massing submarine firepower in wolf packs to cause severe damage to the Allies in the Battle of the Atlantic. "Early in World War II, U-boat sinking of merchant shipping reached the disastrous figure of a million tons [sic] a month."²⁶ To counter the U-boat threat in the Battle of the Atlantic, the Allies spent more than fifteen times than did the Germans.²⁷

There is no denying that the submarine was the greatest threat to Allied victory over the Axis. The German submarine fleet sank 2,575 Allied and neutral merchant ships, totaling 14.5 million tons....One boon Doenitz lacked which his enemies enjoyed was a close cooperation with air forces and scientists. It was the unbeatable combination of surface and air power and scientific research that enabled the British and American antisubmarine forces to win.²⁸

If the Axis had had no submarines, the Allies would have had nearly complete control of the seas, and the buildup to a European invasion at Normandy would have occurred much faster.

²³ Weir, "Silent Defense: One Hundred Years of the American Submarine Force."

²⁴ Morison, 562.

²⁵ W. J. Holmes, Undersea Victory: The Influence of Submarine Operations on the War in the Pacific, (New York: Doubleday & Company, 1966), iii.

²⁶ Cope and Karig, 237.

²⁷ LCDR Michael Poirier, "Sea Control and Regional Warfare," U.S. Naval Institute Proceedings, July 1993, 64.

²⁸ Morison, 563-4.

Without submarines, the balance of power in the Pacific Theater would have shifted to Japan in a dramatic fashion. Japan's plan to obtain natural resources from Southeast Asia may have worked. The resource-starved industry would have been able to churn out more commercial shipping and warships. The nearly one third²⁹ of all Japanese warships that were sunk by U.S. submarines would have been available for naval battles, which may have been enough for Japan to continue the naval successes of the Guadalcanal Campaign. The American island leapfrog plan through the Pacific would have been much more difficult and more costly in terms of lives and material. General Tojo of the Imperial Japanese Army told America's General MacArthur after the war that the depredation of United States submarines (destruction of her merchant marine) was one of the three principal factors that defeated Japan.³⁰

"[T]he [U.S.] Submarine Force scored the most complete victory [in the Pacific theater] of any force in any theater of [WWII]."³¹ Even though they were hamstrung with defective torpedoes for the first two years of WWII, the U.S. Submarine Force achieved great successes.³² Comprising only 1.6% of the WWII United States Pacific Fleet, they destroyed 54.7% of the Japanese merchant fleet and 29% of enemy combatants lost in that theater. They accounted for 73% of all Japanese losses in the first two years of the Pacific War.³³ The submarines' stealth and endurance was key to their achievements.

Only the submarines' endurance and ordinance load limited their reach, and the U.S. submariners continually penetrated the Japanese controlled areas. They carried out unrestricted warfare against enemy merchants and warships, even in Japanese home

²⁹ Morison, 493-4.

³⁰ Morison, 282, 493. Paraphrased.

³¹ Weir, "Silent Defense: One Hundred Years of the American Submarine Force."

³² Blair, xviii.

waters. Five hundred four³⁴ pilots were saved in combat search and rescue operations conducted off of the Japanese coast. Former President George Bush benefited from one of these missions when he was pulled from the sea by a submarine. Submarines were used for critical supplies and evacuation and, eventually, Special Forces insertion and extraction in the Philippine Islands. The enemy had no at sea hiding places from the submarine.³⁵

Before [WWII], United States and Japanese doctrine of submarine employment was identical – to use the boats primarily to destroy enemy warships. In practice the United States Navy, apart from special missions and supporting a fleet offensive, employed its boats as the Germans did, to reduce the enemy merchant marine. But the Japanese I-boats...rigidly concentrated on sinking enemy warships. They were fairly successful at this in 1942...but as American antisubmarine doctrine improved they seldom got in a shot.... And much of Japan's submarine potential was wastefully diverted to special missions.... By 1943 the United States Navy was able to stop convoying merchant ships in the Pacific and employ escort vessels to better purpose.³⁶

"[T]he submarines more than any other single branch of the armed services were responsible for Japan's defeat."³⁷

In WWII, submarines proved to be a relevant contribution to deterring and fighting America's wars. Submarines, which enjoyed the advantages of stealth and endurance, brought enormous success in WWI and WWII and are a necessary component of any balanced fleet.

Evolution of the Modern Submarine: Conventional and Nuclear Deterrence

Nuclear propulsion, introduced with *Nautilus*, the world's first nuclear powered submarine and first true submersible, dramatically increased the submarine's operating

³³ Theodore Roscoe, United States Submarine Operations in World War II (Annapolis: Naval Institute Press, 1949), 46.

³⁴ Roscoe, 474.

³⁵ Weir, "Silent Defense: One Hundred Years of the American Submarine Force."

³⁶ Morison, 496.

³⁷ Cope and Karig, 237.

range and flexibility. Submerged operations became virtually limitless due to the addition of a carbon dioxide scrubber and a water maker, and the battery was relegated to an emergency propulsion role. The submarine's operating domain spread to virtually all ocean areas, as the *Skate* demonstrated by surfacing at the North Pole.³⁸ *Skipjack* was the first nuclear submarine with the teardrop-shaped (*Albacore*) hull design, which greatly advanced noise reduction and underwater speed. *Skipjack* also introduced an improved reactor design, S5W, which allowed not only deep diving, but also high speeds submerged.³⁹ The nuclear powered submarine could dive deep, go fast, stay submerged for months, and travel extreme distances without refueling.

Both civilian and military authorities recognized shortly after WWII that the German U-boat technology obtained and exploited by the Soviet Union might present the most potent postwar naval threat to the United States. Because of this, the U.S. concentrated on improving speed, silencing, depth, and sonar detection capabilities.⁴⁰

In 1956, Chief of Naval Operations Admiral Arleigh Burke commissioned Project Nobska to study the effect of advanced technologies on submarine warfare. The result was a greater emphasis on deep diving, quieting, and long-range sonar designs. This project produced the *Tullibee*, which had the first bow-mounted spherical sonar array, canted torpedo tubes amidships, and a very quiet turboelectric power plant. *Permit* also incorporated design recommendations from Project Nobska in the form of hull streamlining, sail area reduction, reactor plant quieting, and deeper diving depths.⁴¹

³⁸ "Submarine Technological History."

³⁹ "Submarine Technological History."

⁴⁰ Weir, "Silent Defense: One Hundred Years of the American Submarine Force."

⁴¹ "Submarine Technological History."

These design changes resulted in significant increases in operational capabilities, making detection by an adversary even more difficult.

U.S. submarines participated fully in the beginning of the Cold War as missile shooters and missile boat killers. By 1961, the Soviet Union had more operational submarines than the rest of the world combined; thus, the Soviet threat had become a reality. This threat prompted the U.S. to enhance its submarine deterrence capability.

An important component of countering the Soviet nuclear threat was U.S. *Fast Attack* submarines on 40 day "specops" (special operations) ready to eliminate their ballistic missile submarines before they could launch missiles at America. Today, the *Fast Attack* submarines concentrate their efforts on the threat associated with a regional conflict rather than hunting down Soviet ballistic missile submarines. Attack submarines can offset large numbers of surface ships by the mere possibility of their presence.

The Soviets made the submarine the emphasis of their nuclear deterrent and Navy. They built a 2:1 advantage over the U.S., but the Americans countered with more advanced torpedoes and submarine designs to produce quieter operations and advanced sonar designs that allowed better detection of other submarines.

"A mix of forward deployable non-strategic nuclear and conventional weapons adds credibility to [U.S.] commitments."⁴² This credibility is fundamental to protecting U.S. interests around the world, and the submarine is fundamental to this credibility in an era of thinly stretched assets. The possibility of U.S. submarine presence alone will allow

⁴² U.S. Department of Defense, National Military Strategy of the United States of America: Shape, Respond, Prepare Now: A Military Strategy for a New Era, 1997 (Washington, D.C.: GPO, 1997), 25.

more visible assets to be focused elsewhere. For example, "U.S. and British submarines fired 25% of the Tomahawk missiles used in NATO's air war against Yugoslavia."⁴³

Any submarine, especially a diesel-electric lying quietly on the ocean floor, is extremely difficult to locate. Even another submarine may have a tough time finding an adversary's submarines if they follow strict measures to limit the emanation of noise and the exposure of any portion of the submarine above the surface. Decades of exercises and 45 years of Cold War experience have proven that the submarine is the most capable asset for finding another submarine. Other units, such as airplanes and surface ships, require a coordinated effort and the expenditure of relatively large amounts of ordnance to locate and eliminate a submarine.

Submarines deter potential adversaries from taking actions that are inimical to the interests of that state. American deterrent credibility draws upon the capability of the nuclear strategic Triad of long-range bombers, land based intercontinental ballistic missiles, and submarine launched ballistic missiles and America's ability to convince an adversary that she will actually use them.

The U.S. exercises extended deterrence, protecting her allies as well as her own interests by placing them under her nuclear umbrella. This should help reduce nuclear proliferation by reducing the U.S. allies' need to develop nuclear weapons themselves.

The alternative to nuclear deterrence is not palatable. This would require the U.S. to disarm, leaving the country vulnerable to an eventual attack. Additional issues affecting nuclear deterrence are the proliferation of nuclear and missile technologies that require the U.S. to develop a missile defense system and terrorism, which threatens WMD use.

⁴³ Bradley Graham, "Pentagon Warns Against Cutting Attack Sub Fleet: Study Presents Administration With Additional Budget Challenge," Washington Post, 4 January 2000, sec. A.

Deterrence is more important than it ever has been. The Cold War was not likely to turn nuclear, but today's environment is likely to produce at least chemical or biological, if not nuclear, weapons use. Since the U.S. does not use chemical or biological weapons anymore, the only potential U.S. response is nuclear (either response in kind or overwhelming) if conventional arms do not work.

The submarine role in nuclear deterrence began shortly after WWII. The first guided missile to be launched from a submarine was on *Cusk* in 1947. This missile, the LOON, was based on the German V-1 rocket.⁴⁴ The Regulus missile, stored in an airtight hangar on deck, was based on the German V-2 rocket. The Regulus I missile had a 500 mile range and was first launched in 1953. It was capable of carrying a nuclear warhead. Five submarines conducted 40 Regulus strategic deterrent patrols between October 1959 and July 1964. These diesel powered submarines were America's first nuclear deterrent patrol submarines. Although successfully tested, the Regulus II missile program, a supersonic Mach 2 missile with a range of 1,200 miles, was dropped in favor of the Polaris ballistic nuclear missile.⁴⁵

In 1956, Admiral Arleigh Burke directed Vice Admiral William Raborn, Jr. to explore the possibility of employing ballistic missiles on nuclear submarines. The Regulus program required a submarine to surface prior to firing its missiles, but the new program would allow the launching of missiles while submerged.

The Polaris A1 missile program began in 1956, and Raborn accomplished his mission in five years, half the time allotted. The program's early completion was

⁴⁴ Dr. David K. Stumph, "1961 U.S. Navy Guided Missile Submarines," Washington State University, <<http://www.scs.wsu.edu/~gadrian/sub1.html>> (17 January 2000).

⁴⁵ Dr. David K. Stumph, "Regulus Guided Cruise Missile," The Regulus Cruise Missile: A Forgotten Weapon System, <<http://www.wa3key.com/regulus.html>> (17 January 2000).

facilitated by the launch of the Soviet satellite Sputnik and the resultant feeling that the Soviets were outstripping the U.S. technologically.⁴⁶ The Polaris missile could target 80% of the earth, using a solid propellant fuel and multiple warheads.

Strategic deterrence became a primary mission of the submarine force in 1959 with the introduction of the *George Washington*, the world's first nuclear powered ballistic missile submarine, and the first successful launch of a Polaris A1 missile on July 20, 1960.⁴⁷ The powerful force of nuclear missiles was combined with the stealth, endurance, survivability, mobility, flexibility, and lethality of the nuclear submarine. The most ready and cost effective arm of the strategic Triad was then, and remains today, the ballistic missile submarine.

The "41 for freedom" slogan became a Cold War cry as the U.S. built up the submarine portion of the nuclear Triad. Forty-one *Fleet Ballistic Missile* submarines built in seven and one-half years,⁴⁸ starting with *George Washington*, used two rotating crews and were forward deployed, spending most of their time on 77 day deterrence patrols⁴⁹ in constant communication with the National Command Authority awaiting orders. Today's Trident D5 missiles,⁵⁰ with their improved range and accuracy, can target virtually any point on the earth without the need for overseas basing. Nuclear ballistic missile submarines on strategic patrols significantly enhanced America's deterrent capability in the Cold War due to their mobility and survivability which allowed a credible second strike capability ready at a moment's notice.

⁴⁶ Henry Kissinger, *Diplomacy*, (New York: Simon and Schuster, 1994), 570.

⁴⁷ "Submarine Technological History."

⁴⁸ ADM Richard Mies, "The SSBN in National Security," *Undersea Warfare*, Fall 1999, 2.

⁴⁹ "Strategic Deterrence," Special Pullout Section, *Undersea Warfare*, Spring 1999, 13.

⁵⁰ Chief of Naval Operations, N87, "Trident Fleet Ballistic Missile," *The United States Navy: Navy Fact File*, <<http://www.chinfo.navy.mil/navpalib/factfile/missiles/wep-d5.html>>, (16 November 1999).

The Cold War was won especially by...America's nuclear powered ballistic missile submarine fleet...no one has done more to prevent conflict, no one has made a greater sacrifice for the cause of Peace, than ...America's proud missile submarine family.⁵¹

The mobility, stealth, and endurance of nuclear submarines proved to be the ideal platform for launching ballistic missiles. It was by far the most effective and survivable leg of the Triad, and certainly a viable second-strike capability.⁵²

[The U.S.] Triad of strategic forces serves as a vital hedge against an uncertain future, a guarantor of [U.S.] security commitments to [U.S.] allies, and a deterrent to those who would contemplate developing or otherwise acquiring their own nuclear weapons.⁵³

These *Fleet Ballistic Missile* submarines, SSBNs, are still a necessary part of strategic deterrence, as stated in the 1994 Nuclear Posture Review and the 1997 Quadrennial Defense Review (QDR).⁵⁴

Tomahawk cruise missiles were introduced in the 1970s and incorporated in external missile launch tubes in the later ships of the *Los Angeles* class. *Fast Attack* submarines, SSNs, had an operational and tactical land attack missile in addition to the strategic ballistic missiles carried on *Fleet Ballistic Missile* submarines. Improvements in missile accuracy and range came with the *Ohio* class, eliminating the need for overseas homeports for SSBNs.⁵⁵

The *Seawolf* and *Virginia* class submarines are the most advanced in the world and the best prepared to meet the task of locating and neutralizing any surface ship or submarine threat. The *Seawolf* class is the "fastest, quietest[,] and most heavily armed

⁵¹ Mies, 2.

⁵² Weir, "Silent Defense: One Hundred Years of the American Submarine Force."

⁵³ U.S. Department of Defense, National Military Strategy, 25.

⁵⁴ Mies, 4.

⁵⁵ "Submarine Technological History."

submarine in the world."⁵⁶ The newest submarine class, *Virginia*, is designed to fight in the littorals with systems that optimize Joint operations in shallow coastal regions, including land attack, intelligence gathering, mine reconnaissance, and support of Special Forces.⁵⁷

Virginia ... fully embraces the new strategic concept in ...*From the Sea* and *Forward...From the Sea*. It is the first U.S. submarine to be designed for battlespace dominance across a broad spectrum of regional and littoral missions as well as open-ocean, 'blue water' missions.⁵⁸

The use of modular designs and Commercial Off-The-Shelf technology is dramatically reducing the time required to incorporate new technologies in submarines.

Today, the *Fast Attack* submarine remains uniquely capable of locating and destroying enemy diesel-electric and nuclear submarines. "Specops" (intelligence gathering), another unique capability of submarines, remain in high demand by JTF Commanders. Submarines are routinely integrated into the Carrier Battle Group at the tactical level, but not with the Amphibious Ready Group. As the first century of U.S. submarines comes to a close, the potent threat of modern submarine warfare still means there is no new world order that logically leaves out submarines as a weapon to be used and defended against.

This chapter has explored the inherent submarine characteristics and the evolution of submarine roles. The characteristics of stealth, endurance, survivability, mobility, flexibility, and lethality have been clearly demonstrated throughout history. The Submarine Force began with only a coastal defense role that expanded to add attrition of surface combatants and interdiction of commercial shipping in WWI. The number of

⁵⁶ "Submarine Technological History."

⁵⁷ "Submarine Technological History."

submarines increased dramatically by WWII, and, by then, the successful WWI submarine roles were elevated to the strategic level of planning. Additional special mission roles were added in WWII and refined with the introduction of the modern nuclear submarine. Strategic ballistic missiles and land attack Tomahawk missiles were later added, expanding submarine roles to include strategic nuclear deterrence and medium range conventional or nuclear land attack.

⁵⁸ Chief of Naval Operations, N87, "Attack Submarines – SSN," The United States Navy: Navy Fact File, 1 November 1999, <<http://www.chinfo.navy.mil/navpalib/factfile/ships/ship-ssn.html>> (16 November 1999).

Chapter 3: Current Strategy and Future Concepts

*[The] challenge [is] maintaining a combat ready force in an environment of increasing operational requirements and declining resources...*⁵⁹

--LTGEN Bruce B. Knutson

This chapter will analyze the relationship of the current National Security Strategy, National Military Strategy, and Joint Vision 2010 concept to submarine warfare in the United States.

National Security Strategy

The Submarine Force plays a significant role in ensuring National Security Strategy (NSS) objectives are accomplished by helping the Joint Task Force Commander establish and maintain maritime dominance through the conduct of advanced Intelligence, Surveillance, and Reconnaissance (ISR), the attack of sea-based threats, and the support of ground operations. These three submarine mission capabilities support the core National Security Strategy objective of enhancing national security through diplomacy and military forces ready to fight and win wars. This objective also makes submarines capable of contributing to three of the six NSS strategic priorities:

1. Keep America the world's leading force for peace
2. Increase cooperation in security threats that disregard national borders
3. Strengthen diplomatic and military tools required to address these challenges⁶⁰

The significant conventional and nuclear deterrent role of submarines facilitates the first priority above, an "unrelenting force for peace."⁶¹ Although diplomacy is the best way to accomplish the second priority due to the criminal nature of transnational threats,

⁵⁹ LTGEN Bruce B. Knutson, lecture at Marine Corps University Command and Staff College at Quantico, 19 January 2000.

⁶⁰ U.S. White House, A National Security Strategy for a New Century, 1997 (Washington, D.C.: GPO, 1997), ii.

⁶¹ U.S. White House, ii.

submarines are also a serious deterrent to international security threats. For example, the alleged Osama Bin Laden sponsored U.S. embassy bombings in Africa prompted the President of the United States to call on submarines and other assets to destroy land targets with cruise missiles. The last priority, to strengthen diplomatic and military tools required to address the other five challenges, enables the others and requires a strong, ready, and modern Submarine Force resourced and trained to handle each contingency passed its way.

The U.S. Strategic Command receives less than 2% of the Department of Defense budget to provide strategic nuclear deterrence, and the *Fleet Ballistic Missile* submarine is the least expensive arm of that Triad. SSBNs provide more than half of the Triad's strategic arsenal and use less than 1.5% of naval personnel, costing less than 35% of the strategic budget.⁶² In fact, due to their inherent characteristics and a lower life cycle cost, submarines are a cheaper conventional deterrent and provide a flexible forward presence.

The National Security Strategy requires the military to

have the ability to respond to challenges short of war, and in concert with regional friends and allies, to win two overlapping major theater wars. [The U.S.] will continue pursuing diplomatic, economic, military, arms control, and nonproliferation efforts that promote stability and reduce the danger of nuclear, chemical, biological and conventional conflict.⁶³

The threats to U.S. security come from three areas: regional or state-centered, transnational, and Weapons of Mass Destruction (WMD). An interagency and multinational effort is required to ensure security. This can be done by "denying

⁶² Mies, 6.

⁶³ U.S. White House, 5.

terrorists safe havens, ... and tightening intelligence cooperation to prevent weapons proliferation, terrorist attacks and international crime."⁶⁴

Submarines, as a part of military shaping of the international environment, help promote regional stability around the world by being forward deployed and operating with allies to enforce security commitments. They also provide a submarine nuclear deterrent force. Submarines are both capable of and credible in protecting vital, important, and peripheral U.S. national security interests.⁶⁵

The U.S. military may be called upon to respond to a crisis involving any one of the three levels of national interest, but public support for any operation is paramount to success. The potential cost of U.S. military action must be weighed against the potential benefits, and then a decision can be made to employ the military.⁶⁶ For example, the cost of potential regional instability and disruption of world oil flows was weighed against the likely military losses in removing Iraq from Kuwait in 1991. Public support was garnered through the media over several months.

The four transnational threats delineated by the National Security Strategy are terrorism, drug trafficking, international organized crime, and environmental and security concerns.⁶⁷ Submarines influence both terrorism and drug trafficking. Smaller-Scale Contingency deterrence, which includes transnational threats, generally involves moving military forces to a given theater to provide a credible military presence capable of carrying out stated U.S. intentions and influence the opposing party's actions.

Submarines retaliate against terrorists by using land attack missiles against the sponsor

⁶⁴ U.S. White House, 5-6.

⁶⁵ U.S. White House, 6-8.

⁶⁶ U.S. White House, 9.

⁶⁷ U.S. White House, 10-1.

state or terrorist assets, as recently occurred in Sudan and Afghanistan in response to U.S. embassy bombings. Drug trafficking support can be provided to the Coast Guard and other military forces in the form of covert intelligence gathering. These Smaller-Scale Contingencies require a significant commitment over time and must integrate both the submarine and the military as a whole with the interagency process to be successful.⁶⁸

The NSS states that the U.S. must provide a credible deterrent and, if deterrence fails, win two distant Major Theater Wars with overlapping time frames. This presents the U.S. with three challenges. Submarines facilitate the U.S. ability to meet this challenge in several ways. First, submarine mobility and forward presence along with forward logistics and maintenance support meet the challenge of maintaining the ability to rapidly defeat initial surface and subsurface enemy advances in two theaters in close succession. Second, submarine ISR, SOF, and shaping with Tomahawk Land Attack Missiles (TLAM) fill an important role in preparing to fight and win in an asymmetric environment in which unconventional means will be used. Finally, the transition from global engagement in peaceful and Smaller-Scale Contingency operations to fighting two Major Theater Wars nearly simultaneously would be almost seamless due to the flexible forward presence of deployed submarines and the continuing training program onboard submarines.⁶⁹

National Military Strategy

The National Military Strategy (NMS) describes the current environment as a multi-polar world. It discusses the imperative of engagement through shaping in order to produce a more peaceful and stable world. The U.S. will deter and defeat threats to its

⁶⁸ U.S. White House, 10-1.

⁶⁹ U.S. White House, 12.

interests by maintaining the ability to fight two nearly simultaneous Major Theater Wars while dealing with a variety of other Smaller-Scale Contingencies.⁷⁰ The U.S. has been engaged in about 80 of these in the last 80 months. The National Military Strategy did not forecast the high level of daily involvement caused by these Smaller-Scale Contingencies and the compromise of the ability of the U.S. to fight the two nearly simultaneous Major Theater Wars.

The national military objectives are

To defend and protect US national interests, [U.S.] national military objectives are to Promote Peace and Stability and, when necessary, to Defeat Adversaries. US Armed Forces advance national security by applying military power as directed to help Shape the international environment and Respond to the full spectrum of crises, while [they] also Prepare Now for an uncertain future.⁷¹

Submarines are involved in shaping the international environment through exercises, such as DOGFISH, SHAREM, RIMPAC, and UNITAS; and with North Atlantic Treaty Organization, Partnership For Peace, and Asian and South American nations. Shaping the international environment is done "through deterrence, peacetime engagement activities, and active participation ... in alliances."⁷² Deterrence is based on conventional and nuclear submarine forces, and it must be credible. The submarine conventional force credibility has come from demonstrated capabilities and competence plus the will to act.

Submarines are low-risk and flexible units well suited for independent, advanced operations while forward deployed. Their 90-day endurance means they are still in the theater to support the next phase of operations when the rest of the Fleet arrives.

Submarines contribute to three of the four strategic concepts espoused in the National Military Strategy: to be strategically agile, provide overseas presence, and

⁷⁰ U.S. Department of Defense, National Military Strategy, i.

⁷¹ U.S. Department of Defense, National Military Strategy, 2.

participate in and enable power projection. U.S. strategic agility is the ability to apply military force at its time, place, and method of choosing. The submarine's stealth affords a covert, survivable asset that is free to move while retaining the initiative and controlling the operational tempo in a way that places U.S. adversaries off balance.⁷³

Submarines have overseas presence with the necessary logistical support infrastructure to bring rapid combat power to bear in any region. Their presence is covert until they arrive in a port of call or the Commander-In-Chief provides information that allows the media to announce their presence. This sustainable overseas presence promotes regional stability by preventing conflict and protecting U.S. interests.⁷⁴

Submarines project power in a rapid and effective manner with torpedoes, missiles, and mines. They can remain on station for an extended period of time for ISR missions, but a high usage of torpedoes and missiles would require disengagement to rearm. Carrier Battle Group auxiliary ships lack the capability to rearm submarines. The submarine has some limitations and can be constrained by adversarial action.

These limitations are based on the submarine's inherent characteristics, weapons systems, and terrain. For example, the submarine is most vulnerable to attack when it is moored at the pier, especially in an overseas port. The submarine weapons are not optimized for smaller boats; therefore, these targets would likely go free rather than waste an expensive torpedo on them. Inclement weather and choke points, such as narrow straits, make it difficult for the submarine to accomplish ISR missions and avoid detection by the adversary, respectively.

⁷² U.S. Department of Defense, National Military Strategy, 2.

⁷³ U.S. Department of Defense, National Military Strategy, 3.

⁷⁴ U.S. Department of Defense, National Military Strategy, 3.

Constraints on submarines are based upon the adversary's actions. The adversary can avoid submarine contact by transiting in shallow waters close to shore well inland of international waters. Limiting operations to a land campaign will remove the bulk of submarine power and ability to strike the adversary's forces. An adversary would likely have some diesel-electric submarines and could tie up most of the U.S. Navy submarines while limiting surface force movement just by remaining hidden at sea. U.S. Naval assets would be focused on force protection rather than accomplishing the mission if the adversary conducted a couple of well placed diesel-electric submarine attacks on the Carrier Battle Group followed by an egress from the contested area.

The National Military Strategy delineates a naval force level based on the last Quadrennial Defense Review. This level is twelve aircraft carriers, eleven air wings, twelve Amphibious Ready Groups, 116 surface combatants, 50 attack submarines, 14 *Ohio* class submarines, and augmentation forces of the Naval Reserve.⁷⁵

From December 7, 1941 to August 15, 1945, 258 U.S. submarines conducted at least one war patrol. Fifty-two were lost on patrol.⁷⁶ The current level of production for submarines will lead to a stable level of around 30. Applying the WWII submarine loss rate of 20% means the U.S. levels will fall to less than 24 in any Major Theater War. This number is high since a small force of 30 would need to be at sea on patrol almost constantly to support the vital U.S. interests. Without the addition of significant Combined forces, the result would be a decimated Submarine Force in the end, and its ability to turn the tide, as it did in WWII, would be severely hampered. Recent history

⁷⁵ U.S. Department of Defense, National Military Strategy, 23.

⁷⁶ Hughston E. Lowder, The Silent Service: U.S. Submarines in World War II (Baltimore: Silent Service Books, 1987), v-vi.

tends to validate the adequacy of a small Submarine Force to meet the national needs, but the rise of another major power would require a much larger force level.

Joint Vision 2010

U.S. military procurement and focus are on Joint Vision 2010 concepts. Congress evaluates the military against the Joint Vision 2010 yardstick when debating appropriations. For this reason, Joint Vision 2010 is vital to where the Submarine Force is headed and will be examined in this section.

The end of the Cold War brought the U.S. military a new era, one of doing more with less. The only way for the U.S. to achieve significant increases in capability with less is by making the sum of the parts equal to more than the individual parts. This can be achieved through integration at all levels in the military services, Department of Defense, government agencies, and military industries and across Allies and Coalition partners. The new battlespace will be increasingly lethal and unpredictable. This new terrain will require greater stealth, mobility, dispersion, and tempo.⁷⁷

"Joint Vision 2010 is the conceptual template for how America's Armed Forces will channel the vitality and innovation of [her] people and leverage technological opportunities to achieve new levels of effectiveness in joint warfighting."⁷⁸ America's primary military task is to deter conflict or, if this fails, to defeat the adversary in any ensuing engagement. The U.S. will do this through power projection that will continue to be greatly enhanced by overseas presence,⁷⁹ and the use of "[t]echnologically superior equipment [which] has been critical to the success of [U.S.] forces in combat."⁸⁰

⁷⁷ U.S. Department of Defense, Joint Vision 2010, 1996 (Washington, D.C.: GPO, 1996), 9,14.

⁷⁸ U.S. Department of Defense, Joint Vision 2010, 1.

⁷⁹ U.S. Department of Defense, Joint Vision 2010, 4.

⁸⁰ U.S. Department of Defense, Joint Vision 2010, 7.

Joint Vision 2010 discusses four operational concepts: Precision Engagement (PE), Dominant Maneuver, Full Dimensional Protection (FDP), and Focused Logistics. This process begins with Information Superiority (IS) and technological innovation. It is developed by the four operational concepts then tied together with Joint Doctrine, agile Organizations, Joint Training and education, enhanced Material, innovative Leadership, and high quality People (DOTMLP). The end result is massed effects without necessarily having had to physically mass forces, giving the U.S. Full Spectrum Dominance (FSD).⁸¹ The Submarine Force contributes to FSD, IS, PE and FDP in various ways.

First, the Submarine Force helps to shape the environment by establishing the proper initial conditions through covert advanced operations acquiring vital intelligence, Special Forces insertion and extraction, and TLAM strike operations. The massing of submarine firepower makes this shaping action even more devastating. These effects can be achieved rapidly due to constant forward presence and power projection with overseas maintenance facilities. The biggest deficiency here is ensuring that the other government agencies, Third World countries, Failed States, Non-state Actors, Private Organizations, and Non-governmental Organizations better understand the submarines' capabilities so that they might fear the consequences of engaging them. The desired result is deterrence of emerging crisis situations or large-scale conflicts.

Great advances in submarine integration have occurred in the decade since the Cold War ended. Submarines operate in concert with the Carrier Battle Group, but they lack the necessary integration to operate with surface, air, and ground units in unified action.

Second, information transport and processing and battlespace awareness

⁸¹ U.S. Department of Defense, Joint Vision 2010, 1-2, 18.

requirements challenge the ability to achieve Information Superiority. Submarines lack the bandwidth and communications interoperability to achieve a high degree of information flow that supports battlespace awareness and the effective employment of forces. Even though submarines are usually the last to receive the Carrier Battle Group situational awareness picture, they can be key to enhancing the Joint Task Force Commander's battlespace awareness through the use of Unmanned Aerial Vehicles (UAVs) and Unmanned Underwater Vehicles (UUVs).

The commander must know details of the battlefield in order to employ his forces successfully. Recent conflicts in Bosnia and Kosovo demonstrate the pitfalls of a lack of battlefield awareness. Submarine operated UAVs can assist with detecting the changing threat, collecting information regarding enemy capabilities, and force disposition. Clandestine operations may also be needed to verify information or to collect certain types of information. These can be accomplished using a submarine without alerting the adversary of U.S. presence. This vital information leading to enhanced battlespace awareness will allow the Joint Task Force Commander to best employ his forces while minimizing friendly losses.

Third, Precision Engagement is challenged by the need to generate precision effects. Submarines utilize TLAM and torpedo munitions to employ precision effects offensively against the full range of operational objectives and targets and apply effects simultaneously throughout the depth of the battlespace to overwhelm the enemy.⁸² UAVs are also used to provide a more covert reconnaissance without jeopardizing military personnel lives. UAVs provide real time video to the Joint Task Force

⁸² U.S. Department of Defense, "21st Century Challenges," Joint 2010 Briefings. <<http://www.dtic.mil/jv2010/briefings.htm>> (17 November 1999).

Commander. The tactical TLAM, slated for initial operational capability in 2003,⁸³ will soon provide the ability to hit mobile targets and be redirected in flight.

Finally, the Full Dimensional Protection challenge that applies to submarines is combat identification. The control of UUVs and UAVs from submarines enhances combat identification by locating enemy forces and defensive dispositions and relaying this information to the Joint Task Force Commander, which allows the prompt massing of weapons effects on enemy forces and an increase in the tempo of operations.⁸⁴ The Submarine Force plays an important role in FDP in that it acts with relative impunity and prevents surface and subsurface attacks on the Carrier Battle Group and Amphibious Ready Group in support of Fleet operations. Further, submarines maintain Sea Lines of Communication integrity.

Naval Strategy

The Naval Strategy is composed of both Navy and Marine Corps white papers. *...From the Sea* shifted the focus from a Cold War *blue-water* Navy to a post-Cold War *green-water* Navy focused on the littoral regions of the world. *Forward ...From the Sea* expanded on *...From the Sea* and outlined five broad naval contributions to the NSS:

[U.S.] strategy and policies continue to evolve as [they] learn from [their] recent experiences and prepare for the new challenges and new opportunities of this highly dynamic world. Naval forces have five fundamental and enduring roles in support of the National Security Strategy: projection of power from sea to land, sea control and maritime supremacy, strategic deterrence, strategic sealift, and forward naval presence. [The U.S.] will continue to carry out these roles to protect vital U.S. global interests, citizens, allies and friends, wherever they may be at risk.⁸⁵

The Submarine Force brings a unique set of capabilities to the fight. These capabilities enable three major roles for *Fast Attack* submarines in executing ISR

⁸³ "Submarine Strike," Special Pullout Section, Undersea Warfare, Spring 1999, 10.

⁸⁴ U.S. Department of Defense, "21st Century Challenges."

missions, locating and destroying sea-based threats, and supporting ground operations. The ISR role consists of Electronic Intelligence (ELINT), Acoustic Intelligence (ACINT), Photographic Intelligence (PHOTOINT), Imagery Intelligence (IMINT), Visual Intelligence (VISINT), Communications Intelligence (COMINT), Foreign Instrumentation Signals Intelligence (FISINT), Measurement and Signals Intelligence (MASINT),⁸⁶ and other aspects of advanced operations, such as Special Forces insertion and extraction for hydrographic surveys and reconnaissance. Submarines proved in WWII that they are the best at locating and destroying opposing surface and subsurface force threats.⁸⁷ The ground operations role is the least exploited of the three. Ground troops are supported with Special Forces, TLAM, and soon the tactical TLAM, but no indirect fire support currently exists.

Fleet Ballistic Missile submarines support the strategic deterrent role by putting to sea and remaining hidden to an adversary's forces. Forward deployed SSNs project combat power at sea and ashore to support the national strategic objectives. They are uniquely capable of controlling Sea Lines of Communications and maritime supremacy.⁸⁸

In the case of littoral warfare, the art of risk management starts with intelligent employments of SSNs.... If U.S. capital ships do not fall victim to diesel submarines or mines, they may well succumb to precision-guided missile launches from enemy land, air, or sea launchers. The SSN is uniquely suited to preclude this possibility while remaining impervious to enemy attack.⁸⁹

Not only do submarines make a significant contribution to Fleet operations, but they also can assist amphibious forces in forcible entry operations and the *Operational Maneuver From the Sea* (OMFTS) concept. OMFTS further refines littoral warfare as "a

⁸⁵ U.S. Department of the Navy, *Forward...From the Sea, 1994* (Washington D.C.: GPO, 1994), 10.

⁸⁶ "Intelligence, Surveillance, and Reconnaissance (ISR)," Special Pullout Section, *Undersea Warfare*, Spring 1999, 2.

⁸⁷ Lowder, v-vi.

marriage between maneuver warfare and naval warfare."⁹⁰ It is intended to integrate the warfighting functions of Naval and Marine Forces seamlessly across the spectrum of conflict.

Ship-To-Objective Maneuver (STOM) adds a tactical concept used in amphibious operations supporting OMFTS. It applies maneuver warfare concepts to a littoral environment. A STOM landing force will be capable of seamless maneuver from over the horizon directly against objectives deep inland⁹¹ "without stopping to seize, defend, and build up beachheads or landing zones."⁹²

While able to protect Amphibious Ready Group ships from surface or subsurface attack, submarines do not have the capability or integration necessary to support the Marine Corps OMFTS and STOM concepts fully. However, the submarine can provide beach and objective reconnaissance as a part of advanced force operations, which is vital to an amphibious assault. A larger Special Forces contingent could be placed onboard submarines with an increased Command and Control (C²) capability (to overcome the current lack of communications integration with ground troops) to support STOM. To be effective and covert, fire support in the form of guns and medium range missiles would need to be provided by the submarine.

The unique submarine characteristics of stealth, endurance, survivability, mobility, flexibility, and lethality enable it to play a vital role in executing ISR missions, locating and destroying sea-based threats, and supporting ground operations. The submarine force mission is

⁸⁸ U.S. Department of the Navy, *Forward...From the Sea*, 1.

⁸⁹ CDR Kevin Peppe, "Submarines in the Littorals," *U.S. Naval Institute Proceedings*, July 1993, 48.

⁹⁰ U.S. Department of the Navy, *Operational Maneuver from the Sea, 1996* (Quantico: GPO, 1998), I-22.

⁹¹ U.S. Department of the Navy, *Ship-To-Objective Maneuver, 1997* (Quantico, VA: GPO, 1997), II-24.

To provide the National Command Authority, Theater Commanders and Joint Task Force Commanders with:

1. A survivable force capable of deterring regional aggression or strategic global attack,
2. Early, accurate and sufficient knowledge of pre-crisis situations at sea and on land, as well as the battlefield on which power may be projected from the sea,
3. Clandestine and timely striking power against critical targets at sea and ashore,
4. Capabilities to prepare the battlespace and enable the establishment and support of an expeditionary force on land, and
5. The naval superiority to defeat enemy forces, control sea lines of communications and dominate the maritime battlespace.⁹³

The traditional role of submarines from coastal defense to strategic nuclear deterrence was examined in chapter two, and the strategies and future concepts affecting submarines such as peacetime engagement, special operations, precision strike, sea denial, and deterrence were then reviewed in this chapter. However, there are some limitations on the use of submarines including vulnerability to attack in port, specialized weapons focused on larger ships, and mission degrading inclement weather and choke points. The adversary may constrain submarine effectiveness by limiting operations to a land campaign, transiting only in inland waters, and selected diesel-electric engagements. Past lessons and current strategies will now be combined to project the future role of submarines.

⁹² U.S. Department of the Navy, *Ship-To-Objective Maneuver*, 1997, II-10.

⁹³ U.S. Department of the Navy, N87, "U.S. Navy Submarine Force Mission," <<http://www.chinfo.navy.mil/navpalib/cno/n87/mission.html>> (16 November 1999).

Chapter 4: Future Roles of the Submarine

*Submarine[s] [are]...vitaly important to U.S. national security*⁹⁴

--Richard Danzig

The traditional role of submarines has changed dramatically in the last century.

Submarines began the century with one mission, coastal defense, and ended the century with missions in at least five vital areas: peacetime engagement, special operations, precision strike, sea denial, and deterrence.⁹⁵

This chapter will show how submarines fulfill the requirements from the National Security Strategy, National Military Strategy, Joint Vision 2010 concept, and Naval Strategies discussed in chapter three and act as a force multiplier. It will also analyze expanded roles and alternative uses of submarines.

The discussion in chapter three of current strategies and future concepts has shown the dominant role of U.S. submarines in undersea warfare, surface warfare, and strategic nuclear deterrence. In the words of the Secretary of the Navy Richard Danzig, "[t]he boats of the *Virginia* class surpass the performance of any current or projected threat submarine, ensuring United States undersea dominance well into this century."⁹⁶ These are roles vital to U.S. national security because the lack of submarines would eliminate the only survivable and assured strategic nuclear retaliatory strike capability as well as leave the U.S. Fleet vulnerable to adversary submarines and practically naked in the face of an enemy submarine initial attack.

⁹⁴ U.S. Office of the Assistant Secretary of Defense, "Navy Names Third Virginia Class Submarine," *DODNEWS-L*, No. 170-00, 7 April 2000, <<http://www.defenselink.mil/news/#BLUETOPS>> (7 April 2000).

⁹⁵ U.S. Department of the Navy, N87, "Submarine Force of the Future," <<http://www.chinfo.navy.mil/navpalib/cno/n87/future.html>> (16 November 1999).

⁹⁶ U.S. Office of the Assistant Secretary of Defense, "Navy Names Third Virginia Class Submarine."

Three of four Joint Vision 2010 areas contain gaps in capability. The first of these gaps is in Full Spectrum Dominance during shaping. The submarine role in shaping can be limited if potential adversaries do not have a good understanding of the capabilities of a submarine and do not fear it as they might otherwise. Joint Task Force Commanders sometimes lack a full understanding of the submarine and, therefore, fail to fully utilize its capabilities. A lack of integration in operations with surface, air, and ground units prevents submarines from unified action in the Joint environment. Second, an Information Superiority gap exists in a lack of submarine communications bandwidth and communications interoperability with other Joint forces, which limits the Joint Task Force Commander's battlespace awareness. Finally, a Precision Engagement gap is caused by a lack of indirect fire support systems onboard submarines. The submarine cannot support ground units ashore without guns or missiles for fires. This severely limits an operation involving Special Forces in which the troops ashore need fire support since any other unit providing these services would not be covert like the submarine.

The National Security Strategy identified three threats to national security. First, an example will show the futility of nuclear deterrence against regional powers. Conventional deterrence is required for these situations.

[The U.S.] strategic nuclear forces complement [their] conventional capabilities by deterring any hostile foreign leadership with access to nuclear weapons from acting against [their] vital interests.⁹⁷

Second, the submarine contribution to countering terrorism and drug trafficking is limited. Third, WMD is a very large concern today due to the proliferation of WMD materials and technology to potential U.S. adversaries. The best deterrence to WMD depends on which group is in control of the WMD. If it is a state, then a nuclear

deterrent backed up by a credible conventional deterrent is required. If a transnational actor is involved, then the actor would need to be handled with conventional deterrence, such as psychological operations through the media combined with naval presence. However, military operations are usually in response to a terrorist act, not in deterring one. One may argue that WMD weapons are complicated. There are several activities that prevent a terrorist group from using their weapons, including political, psychological, and security reasons.

Nuclear deterrence did not work for the Soviet Union against Afghanistan or for the United States against North Korea or Vietnam.⁹⁸ These were conventional arms or asymmetric conflicts in which the nations opposed to the two superpowers knew nuclear weapons would not be used against them or believed so much in their cause that they were willing to risk nuclear intervention. The idea can be applied to transnational threats.

A nuclear arsenal would not deter individuals involved in the three types of transnational threats - terrorism, drug trafficking, and international organized crime - since there is no defined state or military to hold accountable for their actions. Pressure would need to be applied to either the source of the transnational actor's capital or another state that had influence over them.

The critical elements of deterrence are [the U.S.] conventional warfighting capabilities: forces and equipment strategically positioned, [U.S.] capability to rapidly project and concentrate military power worldwide; [U.S.] ability to form and lead effective military coalitions; and [U.S.] capacity to protect [their] homeland, forces, and critical infrastructure from the full range of potential threats.⁹⁹

Today, deterrence is divided not only into two categories, conventional and nuclear, but it is also between two platforms in the submarine community, *Fast Attack* and *Fleet*

⁹⁷ U.S. Department of Defense, National Military Strategy, 14.

⁹⁸ Kissinger, 608.

Ballistic Missile submarines. Submarines are multi-mission capable, so SSBNs could be used for conventional deterrence as well. This would require a shift in training and push the U.S. strategic nuclear missiles closer to hostile nations.

The *Fleet Ballistic Missile* submarine role could be greatly expanded by the conversion of SSBNs to SSGNs. One hundred fifty-four precision strike missiles on each of the four *Ohio* class submarines converted to SSGNs would be substantially more than any other ship in the battle group and would allow the Carrier Battle Group to conduct other business.¹⁰⁰ The battle group, as a whole, normally carries between 120 and 180 TLAMs.¹⁰¹ At least four or five other ships devoted to precision land strike with the Tomahawk missile could respond to other crisis situations around the world as well as devote more of their weapons load to support Carrier Battle Group defense through Theater Missile Defense (TMD) and counteroffensive air strikes.¹⁰² “Two SSGNs could...do the whole Kosovo cruise missile mission,”¹⁰³ resulting in a tremendous savings in terms of both personnel and ship expenditures.

Submarine integration includes peacetime engagement, sea denial, and ground operations support. Peacetime engagement involves four areas: flexible forward presence, ISR, transmitting intelligence, and covert operations. First, a flexible forward presence supports the National Military Strategy through activities such as deployments, port visits, Combined exercises and operations, and military-to-military relations. Second, ISR supports a proactive peaceful engagement to assist advanced operations and

⁹⁹ U.S. Department of Defense, *National Military Strategy*, 14.

¹⁰⁰ RADM William P. Houley, “Making the Case for SSGNs,” *U.S. Naval Institute Proceedings*, July 1999, 47-9.

¹⁰¹ CDR Robert Aronson, “SSGN: A ‘Second Career’ for the Boomer Force,” *Undersea Warfare*, Winter 1999, 22.

¹⁰² Aronson, 22.

¹⁰³ “Interview with CINCPACFLT, Admiral Archie Clemins,” *Undersea Warfare*, Summer 1999, 5.

intelligence preparation of the battlefield in the event of hostilities. Third, near real-time transmission of intelligence to the Joint Task Force Commander helps to mitigate crises by enhancing battlespace awareness. Fourth, the submarine characteristic of stealth, combined with mobility, allows it to operate covertly with relative impunity in hostile waters while protecting the Carrier Battle Group.

The U.S. submarine is dominate in *blue* and *green* waters and successfully interdicts surface and subsurface combatants as well as commercial shipping. Continuing the legacy of constant submarine improvements will serve as a hedge against the rise of another superpower or advanced submarine fleet.

Support for ground operations includes the areas of Special Operations and precision strike. Special Operations Forces clandestine insertion is best accomplished from a stealthy submarine as long as the numbers are limited to a SEAL team of about 20 men (50 for *Seawolf* class submarine *Jimmy Carter*,¹⁰⁴ 66 for SSGNs, and 15 for older classes of submarines). These forces can gather intelligence as a part of advanced operations for amphibious landings or other tactical needs. TLAM provides a 650 nautical mile range missile for shore-based strike¹⁰⁵ (1,600 nautical miles for Tactical TLAM).¹⁰⁶

A sail-mounted 5" gun capable of shooting the Extended Range Guided Munition (ERGM) is not a current consideration for submarines, but the employment of such a system would make sense in littoral warfare. ERGM rounds will be at least an order of magnitude cheaper than missiles. Although missiles can deliver more combat power, the gun may be more than the necessary amount of force in certain situations, such as

¹⁰⁴ RADM John Davis, "USS Jimmy Carter (SSN-23): Expanding Future SSN Missions," *Undersea Warfare*, Fall 1999, 17.

¹⁰⁵ U.S. Department of the Navy, N87, "U.S. Navy Submarine Force Multi-Mission Roles," <<http://www.chinfo.navy.mil/navpalib/cno/n87/mult-msn.html>> (16 November 1999).

supporting a Special Forces objective in which precision and battle damage assessment can be very good. Naval Surface Fires support using the sail-mounted gun will compromise the submarine's stealth but can be managed by limiting surfaced operations and repositioning upon completion of each phase of fire support.

Future integration needs, in light of Joint Vision 2010, will require the Carrier Battle Group to move beyond submarine liaison officers through greater understanding of submarines on the Carrier Battle Group staff, improved submarine communications bandwidth, and removal of the separate submarine communications broadcast. The bandwidth problem is being addressed by increasing communications data transfer rates to 128 kbps with further upgrades later. Integration will be revolutionized by the completion of a Navy-wide intranet (Information Technology 21st Century initiative) prior to 2002 and a fully networked force by 2005.¹⁰⁷

Truly multi-mission *Fast Attack* and *Fleet Ballistic Missile* submarines would have the same roles in conventional deterrence and be fully integrated into the Joint Task Force with respect to Joint Vision 2010 concepts. *Fleet Ballistic Missile* submarines provide an additional role as one of the three legs of the strategic nuclear Triad. There are not enough assets to meet the Joint Vision 2010 requirements; therefore, all submarines need to be fully integrated with the Fleet in Joint Task Force operations to achieve the National Military Strategy objectives.

The Submarine Force considers both *Fast Attack* and *Fleet Ballistic Missile* submarines to be multi-mission platforms that are critical tools in the President's toolbox. When the President reaches into his bag looking for the correct tool to address

¹⁰⁶ "Submarine Strike," Special Pullout Section, *Undersea Warfare*, Spring 1999, 10.

¹⁰⁷ "Interview with CINCPACFLT, Admiral Archie Clemins," 3.

the need to preserve political commitments, ensure regional stability, deter conflict, or defeat this nation's adversaries, he may find a submarine. However, the Submarine Force knows it needs new capabilities to provide the correct tool to complete the mission. There are seven current initiatives.

First, the New Attack Submarine After Next, the sequel to the *Virginia* class, will be an evolutionary development with possible revolutionary aspects. The key aspects of its design will be focused on the littoral environment to address the expected future requirements for dispersed forces in shallow waters. The New Attack Submarine After Next will be key to achieving the Joint Vision 2010 Full Spectrum Dominance goal.

Admiral "Skip" Bowman refers to these aspects as getting connected, payload, modular, and electric.¹⁰⁸ Getting connected will mean breaking radio silence more often and continuing to develop methods for data transfer while submerged at high speeds. These methods include smaller, more efficient communications antennae; long-range acoustic modems; and towed communications buoys. Getting payload refers to expanding the weapons carried by increasing the payload volume capacity. This would allow more innovative designs that are not limited to the 21" torpedo tube launcher. UUVs as distributed sensors and UAVs for covert reconnaissance are examples of new payloads. Getting modular will allow rapid insertion of new technologies and the ability to provide mission modules that tailor the basic submarine to a specific mission with greatly increased flexibility of weapons and equipment to support it. Getting electric is the real revolutionary idea. This would use the nuclear reactor's power more efficiently

¹⁰⁸ ADM Frank "Skip" Bowman, "Submarines in the New World Order," Undersea Warfare, Spring 1999, 4-7.

by placing 100% of the generated power on an electric bus for distribution to propulsion, directed energy weapons and countermeasures, and hotel electricity loads.

Second, another initiative related to Full Spectrum Dominance is the Advanced SEAL Deliver System (ASDS). ASDS relates to the Joint Vision 2010 FSD goal by helping to shape the environment with covert Special Forces insertion of a SEAL squad from over the horizon. The ASDS platform will provide an opportunity to incorporate Army and Marine Special Forces,¹⁰⁹ deliver them ashore, and maintain contact. This will provide greater information flow and further integrate all Special Forces and possible delivery means such as submarines. Further, an *Ohio* class converted to an SSGN would be capable of controlling the ground forces ashore while providing fire support. Special Forces ashore could also direct the submarine for necessary fire or evacuation support.

Third, new technologies for communications and intelligence will enhance the Joint Vision 2010 Information Superiority concept. Communications bandwidth increases and fiber optics use would enable UAVs and UUVs giving the Joint Task Force Commander real-time video. This communications advance would also provide the capability to talk directly with Special Forces ashore, supporting the idea of a higher operational tempo to place the adversary off balance.

Fourth, two initiatives are ongoing to improve the submarine contribution to the Joint Vision 2010 concept of Full Dimensional Protection. Torpedo and sonar sensor improvements, such as the chin-mounted high frequency sonar,¹¹⁰ are being pursued to maintain the U.S. lead in antisubmarine warfare. The second initiative is for UUVs and mobile mines to provide better mine detection and mine deployment.

¹⁰⁹ "Special Warfare," Special Pullout Section, Undersea Warfare, Spring 1999, 11.

Fifth, advanced strike missiles and *Ohio* class submarine conversions to SSGNs aim at adding capability to the Joint Vision 2010 Precision Engagement concept. The Army Tactical Missile System and Enhanced Fiber Optic Guided Missile will add an indirect fire support element to submarine operations with ground forces ashore. This is a necessary addition to submarine capabilities for the Joint Vision 2010 concept of integration (Full Spectrum Dominance) with ground operations. The conversion of *Ohio* class SSBNs to SSGNs will be discussed in more detail below.

The conversion of four *Ohio* class submarines to SSGNs would be cost effective. First, most of the conversion and refueling costs that give them an additional 20-year life would have already been spent starting in 2002 to decommission them (two in 2003 and two in 2004). The cost to decommission will be \$4.4 billion versus \$2.4 billion to convert.¹¹¹ The *Ohio* class submarines are extremely reliable and have sustained decades of operations with two crews and most of any given year underway on strategic deterrence patrols. Upon conversion, they could conduct conventional strategic deterrence patrols forward deployed from the Mediterranean and Western Pacific with the same high reliability and operational tempo. Not only would there be significantly more missiles than on any other ship, but the SSGN could stay on station longer, requiring four ships with the current operational tempo requirements just to meet the staying power of one SSGN and even more to account for the total missile coverage provided.¹¹²

¹¹⁰ LTJG Leonard Moravek and T.J. Brudner, "USS Asheville Leads The Way In High Frequency Sonar," *Undersea Warfare*, Spring 1999, 22-4.

¹¹¹ Aronson, 19-20.

¹¹² Houley, 47-9.

Another important deterrent issue is the current pre-alertment caused by posturing of the very visible surface combatants used for the bulk of TLAM strike missions. An SSGN with the capacity of four ships and the stealth of a submarine would not provide any readily observable precursors that might lead to the hardening or moving of targets. The increased Command and Control possibilities with an *Ohio* class submarine would make the planning and execution of a strike simpler and thus faster once the president gives the order since one SSGN could conduct the entire strike package.¹¹³

An additional benefit from conversion of the four SSBNs would be a dramatically increased Special Forces capability. The 66-man Special Forces capacity would allow two platoons to be housed and operated covertly out of the two missile tubes not being used for the conventional missiles.¹¹⁴ ASDS or Drydeck Shelter (DDS) could be used to provide a substantial Special Forces insertion and recovery capability that would be used with Navy SEALs. This platform would make it infinitely easier for other services (Marine, Army, and Air Force) to integrate with submarines in the Joint environment. The Marine Corps is the obvious fit for using the SSGN with their *Operational Maneuver From the Sea* doctrine. The necessary Command and Control support could be carried out on the highly survivable and covert SSGN platform.¹¹⁵

Congress has approved \$13 million for the current fiscal year to conduct preliminary design work on converting the four *Fleet Ballistic Missile* submarines to SSGNs.¹¹⁶ The design work will have to be completed in about one year to allow for a congressional decision and time for the shipyard to prepare for the first two conversions in 2003.

¹¹³ Houley, 47-9.

¹¹⁴ Aronson, 19-21.

¹¹⁵ Houley, 47-9.

¹¹⁶ RADM Malcom Fages, "Washington Watch," Undersea Warfare, Fall 1999, 1.

The Submarine Force sees itself as the preeminent submarine fleet of the 21st century and the Navy's stealthy, general purpose warship of the future due to a decaying Russian and underdeveloped Chinese Fleet. The U.S. Submarine Force is more advanced than potential adversaries. Submarine forces of friendly nations, such as Britain and France, work with the U.S. as North Atlantic Treaty Organization Allies but are of limited size. The British, though smaller in number, are a highly capable force rivaling that of the U.S.

Fast Attack and *Fleet Ballistic Missile* submarines are touted as multi-mission, but SSBNs are not equipped or trained to perform all of the missions of a *Fast Attack* submarine. True multi-mission submarines would be able to execute the same missions, albeit on different scales, with one notable exception: *Fast Attacks* obviously do not carry the larger strategic ballistic missiles.

Past lessons, combined with current strategy, have been used to project a reasonable future role for submarines. A number of issues have been raised regarding the future role of submarines with respect to gaps in the Joint Vision 2010 concept and the three major threats to national security.

Gaps in the submarine's capability to fulfill Joint Vision 2010 concepts have been demonstrated in the areas of Information Superiority, Precision Engagement, and Full Spectrum Dominance. First, the communications bandwidth and interoperability is not sufficient for a Joint Force to meet the goal of a common relevant operational picture or adaptive Joint Command and Control. Second, the lack of a submarine indirect fire support system for Precision Engagement is being addressed in the realm of tactical missiles but not for an organic gun system. Finally, shaping and integration are lacking as well. Joint Task Force Commanders and their staffs do not fully understand the

submarine capabilities and, therefore, are not able to properly utilize a submarine in the Joint environment. A significant detractor to conventional submarine deterrence is the lack of potential adversaries' knowledge regarding submarine capabilities. A major hindrance to implementing *Operational Maneuver From the Sea* is the lack of integration between submarines and ground forces ashore.

Deterrence issues were raised previously about three national security threats: regional hegemons or states, transnational actors, and Weapons of Mass Destruction. First, nuclear deterrence may work when dealing with a state, but the U.S. is heading toward an inadequate Submarine Force level (30) to deal with the two nearly simultaneous Major Theater War scenarios. Second, transnational actors require a conventional deterrence. Submarines can weigh in with precision TLAM strikes and Special Forces operations as a response to action and, if considered credible by the transnational actor or his surrogate, a deterrent to action. Submarine covert Intelligence, Surveillance, and Reconnaissance operations enable a credible response. Third, WMD may be countered with either nuclear or conventional submarine means. Nuclear and conventional means are possible if a state actor can be identified, but only conventional means are possible if the aggressor is a non-state actor. One last issue is the lack of an initiative to develop a Theater Missile Defense system for submarines. The rapid communications and radar advances of today should make this mission feasible.

Conclusion

*Control of the sea is still necessary to win a war, and the versatile submarine can again tip the scales for the winning power. To counterbalance any submarine menace, a nation must possess two advantages, both stemming from a powerfully efficient navy: a more effective submarine fleet than its enemy, and skillful enough antisubmarine measures and devices to neutralize the enemy's subs when encountered.*¹¹⁷

--Rear Admiral Harley Cope and Captain Walter Karig

The submarine has proven to be a potent force in the traditional major war and Cold War environments and, at times, the key force. The U.S. military's future will best be served with a balanced Fleet that includes a healthy number of submarines easily adaptable to new technologies and designed to perform additional missions not thought possible previously. Submarines need to continue the trend toward integration and move to truly Joint operations. This will not be enough, though. Successful operations will demand the coordination of all elements of national power, requiring active relationships with other government agencies and non-governmental organizations as well as some private organizations.

Scarce national resources allocated to the Submarine Force in limited amounts require smarter use to get the desired output. This use should not be at the expense of personnel fatigue. The crews of every submarine, stabilized prior to the workup and built into a team during the entire six month deployment workup and throughout deployment, should practice employing each weapon system to the maximum extent possible in real world conditions, including live fire and virtual torpedo (Synthetic Environment Tactical Integration)¹¹⁸ exercises. National needs can be met without exhausting the sailors, through improved integration and coordination across the Joint spectrum.

¹¹⁷ Cope and Karig, 240.

¹¹⁸ Will Canto, "Virtual Reality Under the Sea," Undersea Warfare, Winter 1998/1999, 12-4.

Training and retention of key members of the Submarine Force are critical to the submarine role in the 21st century. The expanded role for submarines means that combat systems are more complex and crew training must cover a number of new missions. Not only should more officers be enrolled in Joint Staff Schools, but they should also turn over most of their maintenance roles in port and conduct challenging team scenario-based training. More time at sea should be devoted to realistic multi-ship exercises with live munitions expended for every combat system onboard.

More submarine officers should participate in the Joint Professional Military Education courses; otherwise, integration will be more difficult. This Joint education should also include the advanced warfighting schools that normally are not available to submariners due to the perceived lack of utility of a submariner to the rest of the Joint team. Not only does the Submarine Force need more Joint training, but it also needs a training foundation similar to that of the Marine Corps, wherein all officers in the Navy, regardless of community, have the same frame of reference. More Joint training will allow additional qualified submarine liaison officers and submarine staff officers at the theater and Joint Task Force levels.

The U.S. plan at the beginning of WWII, learned at the expense of WWI German U-boats, was to “have enough experienced skippers to fight a four-year war with full allowance for all normal battle attrition to [U.S.] boats, and experienced personnel to back up the commanders.”¹¹⁹ This premise has changed, however. Currently, the declining procurement budget is leading the U.S. toward 30, not the Quadrennial Defense Review mandated level of 50, submarines, and the retention rates do not support a reasonable reserve necessary for any significant submarine warfare attrition.

Admiral Clemens states that the U.S. needs 72 *Fast Attack* submarines to meet its commitments.¹²⁰ This force level will require increasing production from about one per year currently to almost three per year.¹²¹ The 1998 Defense Science Board also agrees that submarines are vital to national security, and the U.S needs more, not fewer.¹²² It would be naïve to think that the U.S. will produce three *Fast Attacks* per year in peacetime, so the *Fleet Ballistic Missile* submarine conversion to SSGNs becomes even more crucial to future national security needs. Another possibility is to refuel older *Los Angeles* class submarines rather than decommission them early, as is currently planned.

The proliferation of submarines is a serious issue because of the potential damage they can inflict on a Naval Fleet and the immense effort required to destroy them. Countering the Third World acquisition of modern state-of-the-art non-nuclear submarines through technical superiority rather than numerical superiority is the primary mission of the U.S. nuclear attack submarines.¹²³ An even more serious threat would be the proliferation of nuclear submarines. Many nations such as China, France, Russia, the United Kingdom, and the United States have this capability, and others could potentially develop it in the foreseeable future. The proliferation of nuclear submarines to potential adversaries would require a much larger U.S. Submarine Force to deter and defeat them in war.

One essential capability gap exists in the Submarine Force mission, the lack of indirect fire support for troops ashore. Submarines and Naval Surface Fires are never

¹¹⁹ Cope and Karig, 239.

¹²⁰ "Interview with CINCPACFLT, Admiral Archie Clemens," 4.

¹²¹ Barbara Graves and Edward Whitman, "The Virginia Class: America's Next Submarine," *Undersea Warfare*, Winter 1998/1999, 7.

¹²² Bowman, 3.

¹²³ Chief of Naval Operations, N87. "Attack Submarines – SSN," *The United States Navy: Navy Fact File*, 1 November 1999, <<http://www.chinfo.navy.mil/navpalib/factfile/ships/ship-ssn.html>>

mentioned in the same breath. This is unfortunate. With the same spirit of innovation that enabled the nuclear powered submarine *Nautilus* and strategic deterrent missiles fired from submarines, the U.S. can find a solution to this problem and increase the support for troops ashore. New support relationships should be explored wherein forces ashore would control fires from a submarine or a command element aboard the submarine would control units of up to two companies in size. SSGNs and the New Attack Submarine After Next could have this capability in the form of missiles and a sail-mounted 5" gun. *Virginia* should be able to incorporate the missiles in her Vertical Launch System tubes.

Army Tactical Missile System (ATACM), ERGM, UAVs, and UUVs must be fully incorporated into tomorrow's submarines so that they can support the OMFTS vision of future amphibious operations. First, additional PE munitions need to be added to the submarine arsenal. ATACM should be installed on submarines to provide fire support for troops ashore. An organic 5" gun mounted in the submarine's sail could deliver the ERGM round at a much lower cost; therefore, this capability should be developed to support OMFTS as well as the greater Joint Vision 2010 concept.

Second, the UAV platform needs to be expanded to provide ground troops a satellite communications relay that would allow uninterrupted over the horizon communications while moving and operating with submarines. Third, UUVs will be the solution to minefield identification and penetration, even in very shallow water adjacent to the amphibious landing site.

Consideration should be given to the conversion or new construction of SSBNs for

the Theater Missile Defense role. The chapter two example of how the U.S. added the third leg of the nuclear deterrent Triad leads the author to believe that a similar endeavor to add the Theater Missile Defense capability to submarines is within reach once it is perfected on land. This added capability would lend great credibility to the Theater Missile Defense deterrent since a stealthy submarine would not be detectable until actually launching missiles to shoot down incoming missiles; therefore, the adversary must afford the submarine a much larger coverage area due to uncertainty to the submarine's location. The cost associated with this development is currently prohibitive, but, with the political will for development, it is feasible.

All submarines, SSN and SSBN, should be masters of the deep *blue waters* and shallow *green waters* ready to protect the Carrier Battle Group from surface and subsurface threats while providing the Joint Task Force Commander strategic and operational strike options. All facets of advanced amphibious operations should be in each submarine's repertoire to include fire support and Command and Control of Special Forces ashore.

If the United States decides that it does not need submarines in the new information age, the result will most certainly lead to a serious imbalance in naval force. It would be equivalent to the U.S. destroying its entire stockpile of nuclear weapons at the height of the Cold War, leaving the Soviet Union with the capability of eliminating their very existence. Without submarines, the U.S. Fleet would be vulnerable to systematic sinking by any modern submarine. The U.S. naval inventory must include submarines.

To avoid this pitfall, seven major items should be pursued vigorously to meet the challenges of the 21st century. First, four *Ohio* class submarines should be converted to

guided-missile submarines to perform as submerged arsenal ships and Special Operations platforms. Second, *Fleet Ballistic Missile* submarines should perform more traditional *Fast Attack* submarine roles. Third, more realistic training should be conducted by submarine crews using their own ships' equipment. Also, submarine officers should pursue more Joint Professional Education. Fourth, the production level of *Fast Attack* submarines must be elevated to at least two per year, but a level of three per year is required to meet current commitments. Fifth, a submarine capability for fire support of troops ashore should be developed, using tactical missiles and munitions. Sixth, the Joint Vision 2010 and *Operational Maneuver From the Sea* concepts should be supported, using the SSGN, *Virginia* class, and New Attack Submarine After Next. Finally, a Theater Missile Defense role for *Fleet Ballistic Missile* submarines should be developed.

These seven initiatives would be costly in terms of money and personnel but are necessary to meet the 21st century challenges. Three of the seven items – *Ohio* conversions to SSGNs, *Fleet Ballistic Missile* submarine role expansion, expanded crew training using ships' equipment – are low impact and should be incorporated into the Submarine Force without delay. Three of the seven items – increased *Fast Attack* production, added fire support systems, and development of a Theater Missile Defense capability – would require significant additional budget allocations. A larger Department of Defense budget or reduction of other programs would be necessary to obtain the additional funding for these three programs. The most likely decision would be to either increase the budget or not fund some or all of the programs in the near future. Finally, new submarines will be capable and should be focused on supporting the Joint Vision 2010 concepts as soon as they are ready for operations.

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